



Impact of chilling injury and global warming on rice yield in Heilongjiang Province

Author(s): Liu XF, Zhang Z, Shuai JB, Wang P, Shi WJ, Tao FL, Chen Y
Year: 2013
Journal: Journal of Geographical Sciences. 23 (1): 85-97

Abstract:

This study is focused on indexes for the rice chilling injury in Heilongjiang Province during 1960-2009. Firstly, we compared a new derived climate data weighted by rice planting density with the traditional method, and found that the new one is more reasonable to assess the impact of climate change on crop yields. Considering the frequency and intensity of rice chilling in the province, secondly, chilling indexes defined by meteorological, national and international levels were assessed. The result showed that the meteorological standards were suitable for the delayed-type injury, while the international one, so-called sum of Growing Degree Day below threshold (GDD(n-)), characterized best the sterile-type chilling injury for rice. The explanation ability of the rice yield time series model including both injury types as two independent variables reached approximately 92% ($p < 0.05$). Finally, we concluded that the contribution rates of human and weather factors to rice yields are about 87.2% and 12.8% respectively, and as light increasing trend for sterile-type chilling injury was found during heading to flowing period in recent years, indicating a high chilling risk for rice planting in Heilongjiang Province in the future global warming.

Source: <http://dx.doi.org/10.1007/s11442-013-0995-9>

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Security, Temperature

Food/Water Security: Agricultural Productivity

Temperature: Extreme Cold, Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Other Geographical Feature

Other Geographical Feature : Rice Farms

Geographic Location:

resource focuses on specific location

Climate Change and Human Health Literature Portal

Non-United States

Non-United States: Asia

Asian Region/Country: China

Health Impact: 

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Resource Type: 

format or standard characteristic of resource

Research Article

Timescale: 

time period studied

Time Scale Unspecified